

## Total Hip Arthroplasty—A Cure?

MORE THAN 30 years have passed since the late Sir John Charnley ushered in the modern era of prosthetic total hip replacement with his "low-friction" arthroplasty operation.<sup>1</sup> This rather glamorous name obscures the fact that despite its recognized success in treating disabling hip disease, total hip arthroplasty is in reality an internal amputation. Hip replacement is an operative procedure that involves an internal resection of the hip joint with prosthetic replacement. This solution to the difficult problem of hip arthritis has brought tremendous relief to patients, but hardly constitutes a cure.

The interest of most orthopedic surgeons performing this operation has been with perfecting their surgical technique and the technology of the procedure.<sup>2</sup> Major areas of investigation for these prosthetic devices have been biocompatibility, material strength, reproducing joint mechanics, prosthetic fixation to bone, and wear of the weight-bearing surfaces. Dramatic progress has been achieved in several technical areas. The prostheses are generally well tolerated by the adjacent tissues, seldom break, and allow near-normal hip function for ordinary daily activities. Long-term biocompatibility and bone remodeling around these devices are still under investigation. Attaching these prostheses to the adjacent bone in a permanent manner remains a problem, and the promise of biologic fixation without acrylic cement is still evolving. Wear of the bearing surfaces is a major problem that threatens the longevity of these devices. The particulate wear debris from the articulating surfaces can lead to bone destruction and loosening of the prosthesis. Ceramic bearing surfaces may be the best choice in terms of wear performance, but concerns exist about their strength.

In this issue of the journal, Siopack and Jergesen present a complete and objective overview of total hip arthroplasty.<sup>3</sup> They describe the procedure, materials, and surgical indications. The problems and early and late complications are also addressed. Despite the limitations of total hip arthroplasty, the overall effectiveness in terms of patient satisfaction and outcome is well established. Millions of patients with disabling hip disease have had hip function restored following total hip arthroplasty, allowing them to walk, sit, and sleep without pain. Other surgical alternatives such as osteotomy to realign the joint surfaces or arthrodesis, where the joint is fused, remain as viable options in selected patients, especially younger ones.

Further research may solve the technical problems that remain with these prosthetic devices, but there are

those who argue that we are reaching the limits of what can be achieved with current materials and technology. Total hip replacement is currently an effective operation, but the future for the treatment of patients with disabling arthritis may lie elsewhere.

Articular cartilage is at the center of the arthritis problem. This smooth glistening tissue that covers the ends of our long bones to form synovial joints is the site of arthritic interference with joint function. Osteoarthritis is the most common form of arthritis that afflicts patients, usually as they get older. It leads to progressive deterioration of articular cartilage that eventually results in exposed bone surfaces articulating against each other, producing joint stiffness and pain, the clinical hallmark of arthritis.

To approach this disease from a biologic perspective will require a method of restoring or maintaining the structure of living articular cartilage.<sup>4</sup> The properties of this unique tissue cannot be duplicated by any known metal or plastic device. Much ongoing research is devoted to biologic methods of restoring articular surfaces. Some of the more interesting approaches involve using tissue transplants such as periosteal and perichondral grafts or the implantation of chondrocytes or mesenchymal stem cells to generate new tissue.<sup>5</sup> Isolating chondrogenic biochemical factors that could be delivered to the joint at an early stage of the disease would be ideal. The day when we can inject a substance into the joint that will arrest the progression of the disease or, better yet, restore the integrity of damaged articular cartilage, is still far off.

For at least the next decade, however, prosthetic replacement of arthritic hip joints will likely remain the most effective surgical option for advanced disabling osteoarthritis of the hip in elderly patients.

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